OUVENIR OF PANAMA-PACIFIC INTERNATIONAL EXPOSITION, 1915.

WHEAT IN NEW SOUTH WALES AUSTRALIA

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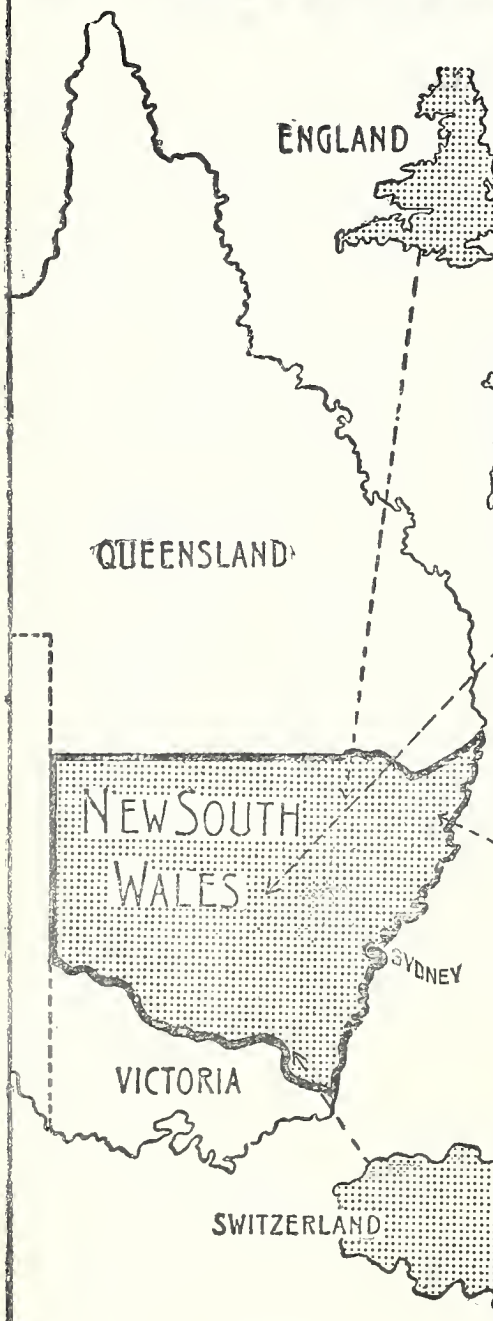
SYDNEY

New South Wales, Australia.



ENGLAND'S bracing climate, freed from its bitter winters, obtains on the great New England plateau, where ideal conditions exist for English mixed farming.

SPAIN'S warm, dry climate and rich soil, with its great wool and grain production, have their counterpart on the western slopes and plains.

ITALY'S warm moisture and rich fertility are surpassed by the rich Northern Rivers of New South Wales, the home of the prosperous dairy-farmer.

The perpetual snow, towering mountain ranges, and cool perennial streams of **SWITZERLAND** are reproduced in the Snowy River district of New South Wales.

The Best of the Young Countries.

WHEAT-GROWING

IN

NEW SOUTH WALES

AUSTRALIA.

By

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GOVERNMENT WHEAT EXPERIMENTALIST.

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Issued by

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GOVERNMENT OF THE STATE OF NEW SOUTH WALES

16377

1915.

A Page of Statistics.

The Population and Trade of the Australian Commonwealth.

States and Territories.	*Population, 31st March, 1914.	Oversea Trade, 1913.
States—		$
NEW SOUTH WALES	1,843,427	325,952,000
Victoria	1,417,972	211,123,000
Queensland	667,633	95,338,000
South Australia	438,488	89,789,000
West Australia	321,281	52,549,000
Tasmania	198,674	7,694,000
Territories—		
Northern Territory	3,687	444,000
Federal Capital	2,859	.....
Australian Warships (Imports)	.. ..	12,475,000
AUSTRALIA	4,893,981	791,364,000

* Exclusive of full-blooded Aboriginals.

The Production of New South Wales— A Year's Progress.

Industry.	1911	1912.
	$	$
Pastoral	97,170,000	97,200,000
Mining	48,745,000	59,085,000
AGRICULTURE	47,050,000	56,145,000
Dairying	26,075,000	28,790,000
Forestry and Fisheries	5,975,000	6,515,000
Others—Poultry, Bees, Rabbits ...	10,275,000	10,445,000
Total Primary Industries ...	235,290,000	258,180,000
Manufacturing (value added to raw materials)	95,715,000	112,320,000
Total Production	$331,005,000	$370,500,000

Some Agricultural Statistics.

Area under Crop in New South Wales.

Year ended 31st March.	Wheat.	Maize	Oats.	Sugar-cane Cut for Crushing	Hay.	Vines. Wine-making.	Potatoes.	All Crops *
	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.
1904	1,561,111	226,834	51,621	10,368	496,017	5,101	20,851	2,542,919
1905	1,775,955	193,614	40,471	9,772	435,704	5,298	23,855	2,672,973
1906	1,939,447	189,353	38,543	10,313	438,036	5,279	26,374	2,838,081
1907	1,866,253	174,115	56,431	10,378	458,172	4,951	36,815	2,824,211
1908	1,390,171	160,980	75,762	9,916	542,761	4,644	31,917	2,570,137
1909	1,394,056	180,812	59,881	6,951	715,896	4,472	26,301	2,713,971
1910	1,990,180	212,797	81,452	6,480	630,664	4,561	35,725	3,174,864
1911	2,128,826	213,217	77,991	5,596	638,577	4,354	44,452	3,381,921
1912	2,380,710	167,781	71,047	5,244	654,149	4,260	43,148	3,629,170
1913	2,231,514	176,471	85,175	6,137	947,062	4,403	34,124	3,737,269
1914	3,205,397	161,968	103,416	6,198	801,136	4,490	38,722	4,568,818

* The figures in this column are exclusive of areas double-cropped.

Production of Crops in New South Wales.

Year ended 31st March.	Wheat.	Maize.	Oats.	Sugar-cane.	Hay.	Wine.	Potatoes.	Total Value of Agricultural Production.
	bushels.	bushels.	bushels.	tons.	tons.	gallons.	tons.	£
1904	27,334,141	6,836,740	1,252,156	227,511	816,810	1,086,820	56,743	41,790,000
1905	16,464,415	4,951,132	652,646	199,640	366,293	928,160	48,754	27,065,000
1906	20,737,200	5,539,750	883,081	201,998	459,182	831,700	50,386	32,715,000
1907	21,817,938	5,763,000	1,404,554	221,560	621,846	1,140,000	114,856	35,585,000
1908	9,155,884	4,527,852	851,776	277,390	376,800	778,500	55,882	32,935,000
1909	15,483,276	5,216,038	1,119,558	144,760	730,014	736,262	71,794	41,590,000
1910	28,532,029	7,098,255	1,966,586	131,081	981,201	808,870	100,143	54,540,000
1911	27,913,547	7,594,130	1,702,706	160,311	843,080	805,600	121,033	47,465,000
1912	25,088,102	4,507,342	1,155,226	147,799	728,474	850,210	75,166	48,740,000
1913	32,487,336	5,111,990	1,674,075	140,914	1,108,275	719,100	91,642	59,080,000
1914	38,020,381	4,359,000*	1,835,406	185,970	955,047	551,700	†95,706	.....

* Estimated. † Includes 80,680 tons the estimated yield from 32,341 acres for winter crop.

A Wheatfield at Tamworth, New South Wales.

WHEAT-GROWING

IN

NEW SOUTH WALES

AUSTRALIA

THE State of New South Wales is capable of producing from its soils nearly everything that is necessary for the subsistence, the comfort, and even the highest luxury of mankind. The territory of the State comprises an area of 310,367 square miles, or 198,634,880 acres—more than two and a half times the extent of the British Isles—and experience has proved that from this great expanse of country can be raised an astonishingly wide variety of products, ranging from wheat to sugar-cane, from tobacco to barley, from cotton to silk and olives, from ostrich feathers to castor-oil, from the luscious strawberry grown in the smiling gardens of Kent to the tropical mango, inured to the blazing heat of the equatorial sun.

Even the most northerly portion of the State is situated well within the temperate zone. Although, as might be expected from the magnitude of the territory, widely different types of climate are to be found in various districts, the weather is, on the whole, very equable and marked by an absence of violent contrasts of heat and cold. It is this wide range of climate, coupled with varying altitudes and soils, that renders possible in New South Wales the production of practically every crop, fruit, flower, and domestic animal that can minister to human comfort or enjoyment.

From the agricultural point of view, the State may be divided into several well-defined territories.

The Agricultural Districts.

The coastal district, north and south of Sydney, consists of a narrow strip of country between the plateau and the ocean. This area is very fertile and well watered, and is the seat of a great dairying industry. Many rivers flow down from the ranges into the Pacific, and the river flats, especially on the North Coast, are of marvellous richness, producing excellent crops of maize. Dairying is making great strides in the north, and some idea of the progress of the industry may be gathered from the fact that the butter output of the State, which in 1903 amounted to 38,727,000 lb., had grown to 77,687,000 lb. in 1913. The tablelands afford ideal conditions for mixed farming, in which the growing of cereals is combined with the raising of sheep and cattle. The western slopes are

PLOUGHING AT COOLAMON, EASTERN RIVERINA, NEW SOUTH WALES.

the home of a great and rapidly expanding wheat-growing industry. The far west consists of a vast area of level grass-land, affording abundant pasturage for the 40.000,000 merino sheep which constitute one great source of the country's wealth.

Land Settlement.

The State of New South Wales at the present time offers a splendid field for the agricultural settler desiring to build up a properous home for himself and his children. The prices of improved agricultural land range from $24 to $50 an acre; of dairying land from $20 to $150; and of grazing land from $5 to $20. The Government periodically resumes large areas of fertile land in well-watered districts, which have been hitherto uncultivated, and makes them available for the small farmer. The prices vary according to the district. Large areas of good land, repurchased by the Government under the Closer Settlement Act, have been disposed of in favourable parts of the State at prices ranging from $5 to $25 an acre. The terms are very easy; a small deposit is made, and the balance paid off over a term of years. There are perhaps even greater openings for the settler on some of the many large private estates which are being periodically cut up. The terms vary in different cases, but generally the purchaser makes a deposit of from a tenth to a quarter of the purchase money, and pays off the balance over a term of years, with 5 per cent. interest on the amount

STRIPPER HARVESTERS IN A NEW SOUTH WALES WHEATFIELD.

outstanding. The settler who is prepared to buy a property outright will have no difficulty in finding suitable land in a desirable district.

Under the Closer Settlement Promotion Act, three or more persons, after having agreed with owners of land as to price and area, may apply to the Crown to purchase the lands.

Everything being satisfactory, the Government will advance 95 per cent. of the Crown valuation, which is repayable in thirty-eight years by the purchaser, at the rate of 5 per cent. per annum, inclusive of interest. In this way, those seeking land may obtain well improved holdings upon exceptionally easy terms, a substantial return being possible in many cases during the first year of tenure.

The area agreed to be purchased by each person must not substantially exceed a home-maintenance area by itself or with any other lands—excepting those held under annual tenure—owned or leased by such person.

In order to enable persons who have taken up land to improve and develop their holdings and to build homes, the Government of New South Wales makes advances to settlers, through the Advance Department of the Government Savings Bank, of amounts ranging from $240 to $9,600. The interest is 5 per cent., and terms of repayment easy. The advances are made upon the security of land purchased either from the Crown or from private owners.

Bona-fide land seekers are granted concessions on the railways when inspecting lands, and when travelling to settle on

WHEAT TEAMS, NEW SOUTH WALES.

their holdings are allowed half rates for their families and effects.

The Progress of Wheat-growing.

The wheat industry in New South Wales at the present time is rapidly increasing in importance. Its condition resembles that of a healthy vigorous child who has emerged from the dangers of childhood, and is developing into prosperous manhood. At first its progress was slow and irregular, but from 1861, when 123,468 acres were planted, the acreage under wheat steadily grew during the next thirty years, until 356,666 acres were planted in 1891. During the next decade progress was more rapid, for in 1901 the area under wheat for grain was 1,392,070 acres. Since then this rate of increase has been more than maintained, for at the present time over 3,200,000 acres are devoted to the cultivation of wheat. As the land now cultivated is less than one-tenth of the area suitable for the growth of this crop within the belt having an average annual rainfall of over 20 inches, which is known now to be the "safe" area for wheat-growing, the expansion which is possible in the near future is obvious.

The slow progress which wheat-growing at first made in New South Wales was due largely to the use of varieties unsuitable for the warmer and drier districts. The wheats first used were those which the early settlers brought with them from Great Britain, and when the difference between the climate of England and that of New South Wales is

HORSES ON A NEW SOUTH WALES WHEAT FARM.

considered, it is not surprising that these varieties were found unsuitable, or only adapted to the cold districts or the moist climates of the coastal areas. By degrees, new and more suitable varieties were obtained, and, as these were secured, wheat-growing spread into districts which before had been considered totally unfitted for that industry, and the rapid expansion of this highly profitable branch of agriculture during recent years came about. This expansion has been materially assisted by the adoption of new methods of cultivation and harvesting suitable for conditions in Australia, where land is cheap, and where large areas are available, and also by the introduction of labour-saving machinery where labour is scarce and high-priced.

That wheat-growing is highly profitable is shown by the comfortable homesteads and thriving financial position of innumerable families in those districts where wheat is king. A very gratifying feature of this prosperity is, that many of these wheat-growers are men who started with little or no capital in hard cash, and in many cases with but little practical knowledge, but have succeeded because of their ability and willingness to work. That such is the case is not altogether surprising when it is known that in a favourable year a farmer will often receive for his crop nearly the capital value of his land. Many instances could be given of men who started in a small way, and who, after putting in their crop, had to leave home to earn the necessaries of life until the wheat was ready to harvest, but who now have steady incomes and own properties and plant whose value runs into four or five

A New South Wales Wheat Stack.

figures. These cases all go to show that to the industrious man with energy and with some skill in farm work, no other industry offers better prospects than wheat-farming.

Climate and Rainfall.

In view of the fact that, in the early days of the industry, wheat-growing in New South Wales was confined to the moist regions of the coastal districts, which have an annual rainfall of 30 to 40 inches, it is interesting to note that the largest recent additions to the area under crop are lands on the western slopes, where the average annual rainfall is 20 inches and under. The cultivation of wheat in the coastal areas has indeed now been practically abandoned on account of the prevalence of rust, combined with the discovery that the drier districts are more suitable, because the crop can be more easily and more cheaply grown. The bulk of the wheat is now grown in the districts bordering on the 20-inch rainfall, many of them having less. An average annual rainfall of 20 to 22 inches is considered ample for wheat-growing and preferable to a heavier one. Actual results have proved the industry to be highly profitable in districts with less than 20 inches—a yield of over 37 bushels (of 60 lb. each) has been obtained with less than 19 inches in the year. What is of more importance than the actual inches of rain received is the period when it falls. Rain is most beneficial in the early autumn, to facilitate ploughing, and in the spring, at the time when the wheat is heading and flowering; and falls at such times assure an abundant harvest. Crops of 20 bushels

BAGGING WHEAT ON A NEW SOUTH WALES FARM.

and more per annum are, under a good system of cultivation, obtained on a rainfall of 7 to 8 inches during the growing period. The wheat districts of the State are fortunate in benefiting by rain at these particular periods.

The very dryness of the wheat districts in summer, which at one time was considered fatal to their suitability for wheat, is now rightly considered one of their advantages, for such dryness is favourable for the production of high-class grain, and because of it rust need only be feared in unusually wet years, hay-making is facilitated, and the crop for grain can be left in the field until thoroughly ripe, when it can be harvested with special machinery and bagged ready for market at a cost of $1 to $1½ per acre (excluding the cost of bags). Certain varieties of wheat, for instance Federation, can be left standing in the paddock for from 4 to 5 weeks without fear of shelling.

The yields in the dry districts of New South Wales are certainly not as large as in the moister ones, but the average return is about 14 bushels, or 840 lb. When this is compared with the 32 bushels which is the average yield of Great Britain, it seems alarmingly small, but such a return as is obtained in our dry districts leaves a very reasonable margin of profit, for the cost of production is correspondingly low. In such districts it is estimated that a crop of 8 bushels per acre, sold at 60 cents. per bushel, will pay the grower. The average price for the last ten years is 74 cents. per bushel of 60 lb. The average return by no means indicates what the dry

A New South Wales Wheat Field.

districts are capable of, for the yields of poor and unskilful farmers reduce the average for a district.

The Narromine district, one in which the most recent expansion is taking place, is in the Central Western plain, and has an average annual rainfall of about 20 inches. This district in the past has averaged 16, 18, and 20 bushels per acre; and as much as 40 bushels per acre from 600 acres, and 25 bushels per acre from 3,000 acres, have been obtained.

The temperature is certainly high at times in the summer (December and January), the thermometer during the hottest part of the day often registering 100 degrees Fahr.; but owing to the dryness of the air this heat can be borne with considerably less discomfort than can much lower temperatures in moister climates. For two or three months in the middle of the summer the conditions during the heat of the day may be trying, but during the remainder of the year the climate is ideal, the winters being so mild that stock need no sheltering, and even fatten on pasture during that season. The districts are remarkably healthy, and it is possible to live out of doors all the year round. Occasional droughts or periods of scanty rainfall are met with, but farmers are learning how to provide for them and by new methods how to make the most of the moisture that falls, so that the injurious effects of dry spells are lessened, and in the future are likely to be still further reduced. Nature is usually so good that when she occasionally frowns folk are apt to be alarmed and unprepared. The climatic advantages of these districts far outweigh their disadvantages, and it is questionable, when all things are considered, whether many more desirable places for residence are to be found.

Disc-Ploughing at Tamworth, New South Wales.

Classes of Land.

The wheat districts comprise all classes of land, from plain open country with belts of timber or scrub, to fairly open or timbered undulating or hilly country. In the open plain country the soil is chiefly rich black loam, which is not considered so suitable for wheat as the red friable loamy soil found on the timbered or scrub lands.

The quality of the land is very good, easily worked, and naturally drained: for several years profitable wheat crops can be grown in succession without manure and with indifferent cultivation. In the districts now devoted to wheat-growing, it is likely that wheat will always be the principal money crop, and when it is grown in conjunction with the cultivation of oats, barley, rape, tares, peas, sorghum, and other crops suitable for stock feeding, there is not the slightest doubt that its profitable cultivation can be carried on for an indefinite period. The unimproved value of land in these districts ranges from $6 to $20 per acre.

Size of Farms.

With the implements now on the market, a good farmer can plant and care for 250 acres of wheat, and some hard-working energetic men manage 300 acres. In the settled districts, wheat farms range in size from 300 to 600 acres, but farms of one, two, and three thousand acres are not uncommon. When fenced, cleared, and provision made for water, they may be put down as worth from $25 to $55 per acre, the value depending upon the improvements and the proximity to the railway.

LOADING WHEAT AT A COUNTRY RAILWAY STATION, N.S.W.

It is the exception to find wheat farms which have a natural permanent water supply. In some instances water is obtained by sinking shallow wells, but in the majority of cases the much-needed provision is made by excavating tanks or dams in suitable low-lying sites, where water from the catchment area can be led into them by means of drains or gutters. The general size of these tanks ranges from 1,000 to 2,500 cubic yards, costing from 15 to 25 cents. per cubic yard to excavate.

Fencing.

The universal practice is to fence each holding, and in the majority of cases convenient subdivision fences are erected. The most common kind of fence consists of posts erected 9 to 11 feet apart, with six or seven wires running through them. The value of this fencing is about $150 to $240 per mile, the cost of the wire being from $40 to $60 per mile. The posts are usually obtained from timber on the property. The advent of the rabbit has rendered it necessary to wire-net the boundary fences, so as to exclude him and prevent his depredations. This necessitates an additional expenditure for these fences of about $225 to $250 per mile. Subdivisional fences can be put up much cheaper.

From Virgin Forest to Wheat Farm.

The ground is most commonly cleared of timber by first ringbarking the green trees and allowing them to die, before fitting the ground for the plough by grubbing them out. Only in a few instances is the ground entirely cleared of green timber, as the latter method is very

A Reaper and Binder at Work.

much more expensive than the former, and for some time after the removal of the green wood the ground is in a sour condition and not in the best state for the growth of crops. After ringbarking, the ground gradually sweetens as the trees die, so that by the time the timber is dead the ground is in fit condition for cropping: and while the trees are dying the ground is used for grazing. The cost of clearing ground on which the timber is dead is only about a quarter or a third that of clearing land with trees growing on it.

Cost of Clearing.

There are various methods of ringbarking in vogue, but in a general way it may be described as the removal of a small strip of bark or sapwood from around the trunk of the tree so as to prevent the flow of sap from nourishing it and making fresh growth. After the trees are ringbarked they generally throw out young shoots—"suckers"—below the ring from which the bark has been removed. The removal of these necessitates another operation, known as "suckering": usually this has to be done twice, and sometimes three times before the trees are dead. The deeper the trees are ringbarked—*i.e.*, the thicker the strip removed—the sooner the tree will die, but the greater the tendency to produce suckers. Ringbarking costs from 20 to 35 cents. per acre, the first suckering 12 cents. and the second suckering 8 cents. When the trees are dead, which is two to three years from the date of ringbarking, they are grubbed or burnt out, all roots within 12 to 18 inches of the surface being removed.

WHEATEN HAY STACKS, NEAR GRENFELL, NEW SOUTH WALES.

The cost of doing this ranges from $2.50 to $4 per acre, so that in the wheat districts the cost of getting timbered country ready for the plough is about $5 per acre, made up as follows:—Ringbarking, 20 to 60 cents; suckering twice, 20 cents.; grubbing, $2.50 to $4. The cost of clearing land in the green state ranges from $10 to $13 per acre.

In some districts it is the practice to cut off the dead trees level with the surface of the ground, the roots below the surface being allowed to remain. This is known as "Yankee" grubbing, and is from $1 to $2.50 per acre cheaper than the ordinary method. It requires special "stump jump" implements to cultivate land so cleared; but seeing that these are available on the market, there is something to be said for this cheaper method of clearing, as the yields obtained from land so cleared are not very much less than from land more thoroughly dealt with, and to a man with limited capital the reduced initial outlay for clearing (either in hard cash or labour) is a consideration. The more careful farmers do not advocate this method.

Ploughing, Sowing, and Harvesting.

In cultivation of wheat, the general custom is to plough the ground as early as possible after the autumn rains in March and April, and then to plant the seed as rapidly as the ground can be prepared until the end of June, when the planting season is considered over. A change is, however, now taking place, for it is generally recognised that better and more certain results are obtained

EMPTYING A STRIPPER.

when the seed is sown on land which has been fallowed and worked during the summer, so that the best farmers now make it a practice to plough at least part of their land in the winter, allow the ground to lie fallow during the summer and then plant at the usual time without reploughing, though in some cases, where the ground is weedy, it is reploughed.

The increased yields which invariably follow summer fallowing are conclusive evidence of its value, and prove that it pays, despite the slightly extra cost incurred in preparing the ground. When the land is not fallowed the operations connected with wheat-growing are usually :—

(1st) Ploughing.

(2nd) Harrowing (if crop be drilled but omitted if crop be broadcasted).

(3rd) Sowing.

(4th) Harvesting.

Where the land is fallowed a slightly different method is followed; then the ground is first ploughed in the spring or early summer, harrowed twice or three times during the summer and perhaps disc-harrowed or cultivated to kill any weeds that may grow. At planting time the seed is sown without any further preparation, unless the ground, despite the cultivation, is weedy, when it may be reploughed. In some cases the ground is rolled either before or after sowing, and in others both before and after. Often the whole of the

LOADING SHEAVES AT A WHEAT FARM ON THE WESTERN SLOPES OF NEW SOUTH WALES.

work done for the land-owner is by contract. The rates ruling for the different items per acre are—

Ploughing.—New ground, $1.68.
Old ground, $1.44.
Fallowed ground, $1 to $1.20.

Harrowing.—12 to 20 cents.

Sowing.—Broadcast, by hand, 15 cents. (seldom practised)
,, with machine, 8 cents.
With grain drill, 30 cents. to 40 cents.

Harvesting.—Stripping and winnowing—
An 8-bushel crop, $1.
A 16 to 20-bushel crop, $1.68.
Or if done with the reaper and binder—
Cutting, 72 cents. to $1.
Twine (say), 48 cents.
Stooking, 18 to 24 cents.
Stacking and carting, $1.8 to $1.20.
Threshing, about 8 cents. per bushel.

Various kinds of ploughs, both the mould-board and disc, are used. The size most favoured is the four-furrow, drawn by five or six horses, a team which an ordinary driver is capable of caring for. The depth usually ploughed is about 4 inches, and rarely exceeds 5 inches; 4 to 5 acres are considered a day's work.

Harrowing is done with a set of three to six sections, covering from 12 to 20 feet; with them from 15 to 20 acres are done daily.

A Good Crop, Wagga Wagga, New South Wales.

The almost general practice now is to plant the seed with a grain drill, at the same time distributing with the seed from 30 to 56 lb. of superphosphate per acre. Both disc and hoe drills are in use, the sizes ranging from twelve to fifteen tubes, and on some large farms drills having twenty tubes are used, the distance between the tubes being 7 to 8 inches. From 12 to 20 acres is an average day's work. A case is recorded where a farmer whose sowing was delayed had 500 acres drilled in twenty-four days with a thirteen-hoe drill. The drill was kept going night and day with relays of men and horses, the necessary light at night being furnished by means of acetylene lamps attached to the drill.

In some instances the seed is still sown broadcast, generally with a machine fitted to a cart or dray, the wheels of which operate the mechanism of the implement. Though this method is cheaper and more expeditious than drilling (with a broadcasting machine, up to 100 acres per day can be sown) it is gradually giving place to the drill, the use of which is now fairly general, as the amount of seed saved when the drill is used, to say nothing of the increased yield, soon pays for its initial cost, which is from £75 to £200. The amount of seed used per acre is 30 lb. to 45 lb. with the drill, and 60 lb. and over when broadcasted.

In some cases the crop or part of it is cut with a reaper and binder, but in the majority of instances it is allowed to stand in the paddock until perfectly ripe, when it is harvested with a stripper or stripper harvester.

THRESHING WHEAT AT GRENFELL, NEW SOUTH WALES.

Harvesting Machinery.

The "stripper" is purely an Australian invention, and is a machine drawn through the ripe standing crop by three or four horses attached to its side, which walk in the stubble of the harvested portion. By means of a comb the ripe ears of wheat coming within reach of the machine are gathered and directed to the cutting plate, where the beater drum cuts them from the straw and threshes the grain out; at the same time the grain with the chaff and a small quantity of straw is deposited in a box-like receptacle at the back of the machine. This box holds about 8 bushels of grain and its accompanying chaff. When the box is full the machine is taken to a convenient place in the paddock and there emptied; here a winnower or cleaner is situated. The mixture of grain cavings, and straw is put through this winnower, which cleans the wheat and bags it ready for market. In fair crops one winnower with four men to work it and sew the bags, will keep two strippers going. In some cases the winnower is driven by a horse-tread power, and then one winnower keeps as many as five strippers going. Stripping starts in the morning about 8 a.m., and is continued throughout the day until about 7 p.m. A man with two three-horse teams, each team working about three hours at a time, will strip, in a fair crop, about 10 acres, yielding, say sixty bags (180 bushels) per day. Cases are common where over 100 bags (300 bushels) are stripped in a day; and a case is known where one driver with his machine stripped ninety-six 4-bushel bags (384 bushels) in one day.

A New South Wales Farmer Inspecting His Crop.

The "stripper harvester" is another Australian invention and an improvement on the simple stripper. Built in as part of the machine is a winnowing attachment, on which the threshed but uncleaned grain is delivered as the machine is drawn through the crop. This implement, in addition to harvesting the ears and threshing the grain from them, as in the case of the stripper, winnows it and delivers it in bags at the side of the machine ready for market, thus considerably reducing the cost of harvesting and in addition enabling the farmer to dispense with a certain amount of outside labour, which is extremely difficult to obtain at harvest time. The stripper harvester is a wonderfully compact machine, and though only introduced a few years ago, has rapidly grown into favour. The comb-gathering device in these implements is 5 to 6 feet wide, and in order to prevent damage to the unharvested crop the machine is drawn by the horses, which are attached to the side. This method of attachment causes a certain amount of side draft, which in the past has prevented the combs on these machines being made wider than stated above. Recently, however, a new implement has been patented, in which the horses are attached to the rear of the machine, and push instead of drawing it, as is usually done. This implement is called the "push" harvester, and because of the position of the horses the side draft is practically eliminated, and in consequence, the comb or gathering device is made twice as wide as in the ordinary harvester or stripper; thus a very much greater area can be harvested per day

A Tobacco Field at Tamworth, New South Wales.

with one of these machines without a corresponding increase in the amount of manual labour required. The harvester is worked by two men, one of whom drives the horses and attends to the machine, the other adjusts and removes the bags and sews them up. The area dealt with by the harvester is about the same as that dealt with by the stripper.

From Farm to Market.

Some farmers draw their own wheat from the farm to the nearest mill or railway station, but the majority have their produce carted in by regular teams, who do this work at reasonable rates, which range up to 25 cents. per bag for a distance of 20 miles.

No difficulty is experienced in selling the grain after it is bagged. Grain merchants and millers are anxious for it, and compete to secure it at prices which are governed by those ruling in Mark-lane, London. The local value is from 25 cents. to 30 cents. per bushel below that ruling in London. On the London market Australian wheat is generally worth 12 cents. per bushel more than British wheat.

The farm horses are usually fed on wheaten hay, cut into chaff and mixed with cracked or pinched wheat. A certain percentage of the wheat harvested is cracked or pinched, and during the operation of winnowing is separated from the marketable grain : this is retained by the farmer for horse and poultry feed.

Wheaten hay is made by cutting the crop just after flowering with the reaper and binder. The sheaves are then

TABLE GRAPES GROWN AT HOWLONG, RIVERINA, NEW SOUTH WALES.

stooked in the paddock for ten or fourteen days until dry enough to be carted in and stacked. The climate renders hay-making exceedingly easy, and tends to produce a bright-coloured nutritious hay. The average yield is from 20 to 22 cwt. of cured hay per acre. But with a system of fallowing a considerably higher yield is obtained. The reaper and binder is drawn by three horses, and requires one driver, who on an average cuts 10 to 12 acres per day. In light crops it requires one man to stook after the machine; in crops yielding from 1½ to 2 tons per acre, two men are required. Very few farmers cut their own hay into chaff. This is done by contractors, who have a travelling plant, comprising a steam engine, chaff-cutter, and bagger, and who go from place to place and cut up the hay into chaff and bag it, charging $2.16 per ton.

Assigning market prices to the material used, the cost of feeding farm horses amounts to about 32 cents. per day.

The Day's Work.

In the ploughing season, work commences at 7.30 a.m. and continues until about 5.30 p.m., with a break of about two hours in the middle of the day for dinner. At harvesting or stripping time, work generally commences about 8.30 a.m. (for during the night the wheat becomes toughened and does not thrash well until the sun is well up), and continues till 7 or 7.30 p.m., with the same break in the middle of the day, and two intervals, one in the morning and one in the afternoon, of twenty minutes each for rest and refreshment.

During ploughing time the driver is required to take care of his own horses, but at harvest time his horses are fed, groomed and harnessed for him, so that the most can be made of his services, the machines kept employed, and the harvest completed as rapidly as possible.

Though the bulk of the wheat is raised by settlers who work their own farms with perhaps just a little help at specially busy times, quite a large amount is now grown on large estates where the most modern and effective implements and machinery for producing this crop are to be found.

The wages paid are—

Ploughmen—$6 per week, and board and lodging.

Harvest hands—Machine men, $1.68 to $2.40 per day; bag sewers, $1.68 per day; ordinary labourers, $1.68 per day; slackers, $2.88 per day; machine men, $1.92 to $2.40 per day; and board and lodging.

Cost of Production.

The following figures give the exact cost of production during two years on one of these large farms in a district with less than 20 inches average annual rainfall. They serve to show how cheaply large areas can be worked.

WHEAT: ACTUAL COST OF PRODUCTION.

1913—area planted, 1,900 acres.

1914—area planted, 1,300 acres.

Putting in crop.—	1913.	1914.
	$	$
Wages	520	595
Rations	72	125
Hut accommodation	70	...
Ration sheep	75	150
Superphosphate	355	600
Oil, rims, brushes, ploughshares, &c.	50	75
Duplicates and repairs	60	47
Forage	465	510
Contracts—ploughing, sowing, harrowing	2,575	1,640
Seed wheat	720	585
Bluestone	8	18
	$4,970	$4,345

Cost of putting in crop per acre—In 1913 ... ... $2.66

In 1914 ... ... $3.34

Harvesting and carting.—	1913.	1914.
	$	$
Wages	970	700
Rations	140	75
Ration sheep	160	120
Contracts—harvesting	1,800	875
Storage on wheat	240	...
Oil, twine, &c.	100	75
Duplicates, repairs...	290	90
Forage	300	375
Cornsacks (station)	700	600
Insurance	285	145
	$4,985	$3,055

Cost of harvesting crop per acre—In 1913 ... ... $2.62
In 1914 ... ... $2.35

Total cost per acre—

1913.	$	1914.	$
Putting in ...	2.66	Putting in ...	3.34
Harvesting ...	2.62	Harvesting ...	2.35
Total ...	5.28	Total ...	5.69

YIELDS.—

1913.—1,900 acres, 16 bushels, at 72 cents ... = $11.52
Less cost of production ... ... = $ 5.28

Profit per acre ... ... = $ 6.24

Net return from 1,900 acres = $11.856.

1914.—1,300 acres, 15 bushels, at 72 cents ... = $10.80
Less cost of production ... ... = $ 5.69

Profit per acre ... ... = $ 5.11

Net return from 1,300 acres = $6.643.

These may be regarded as practically minimum yields on large farms in ordinary seasons, and by no means indicate the possible yields on smaller well-worked farms in similar seasons. They show a reasonable remunerative return from land valued at about $20 per acre, even when the whole of the work is done by contract or by hired labour; the prizes of wheat-growing go, however, to farmers who manage and assist to work their own farms, especially when such are farmed on up-to-date lines, and in conjunction with sheep and other live stock.

WHEAT TEAMS ON A NEW SOUTH WALES FARM.

Share-farming. A considerable number of farms, and particularly the large ones, are worked on what is known as the "shares" system. Under this system a farmer possessing the necessary team and implements arranges with the land-holder to crop a certain area for a season or for a number of seasons. The usual form of agreement provides that the land-owner shall provide land, seed, two-thirds of the manure (where manure is used), and bags for his share; the farmer on his part must perform all the operations of cultivation and harvesting in a workmanlike manner, and at seasonable times, using his own plant for the purpose. He must also provide one-third of the manure (where manure is used), and bags for his share. Up to a specified yield of the crop, the owner and farmer take equal shares; any excess becomes the property of the farmer as a bonus to encourage good and thorough farming. Special arrangements are often made to suit local conditions. For instance, in the southern portion of the State half the crop, and in the western portion two-thirds of the crop, is the sharefarmer's moiety. This method of working large areas is invariably a success where the arrangement is drawn up on a truly co-operative basis, and is one of the most satisfactory ways of working large estates. At "Iandra," the birth-place of this system in New South Wales, some 18,000 acres are planted on the shares system. Share-farming is admittedly not so desirable a condition as that in which every man farms his own land, but such a system is one by which

large properties can be successfully handled, and one by which a man who has no land of his own may accumulate enough means to buy some. That it has done this is proved by the cases of farmers who now have comfortable properties of their own, but who commenced as share-farmers. To suitable men, without capital or plant, some land-owners have advanced sufficient capital to enable the men to buy plant and make a start. In some cases the owner places a price on the land, and gives the share-farmer the option of purchasing his area at that price after five years.

Such terms as these, when they are available, are very advantageous for the new settler with little money at his disposal.

Cost of Implements.

Labour-saving machinery is necessary to the wheat-grower, and he is fully alive to this fact. The machinery merchants assist the man with small capital to acquire this by supplying implements and machines on easy terms, the payments being spread over two or three seasons, and falling due after harvest time. For the accommodation provided a reasonable rate of interest is charged. The cash price in Sydney for some of the various implements, &c., used on a farm, are :—

	$
Ploughs—	
Mould-board, ordinary, 2-furrow	40
Mould-board, ordinary, 4-furrow	90
Mould-board, stump jump, 2-furrow	110
Mould-board, stump jump, 4-furrow	160
Disc, ordinary, 4-furrow	130
Disc, stump jump, 4-furrow	190
Peg-tooth harrows, six sections, 20 feet wide ...	40
Disc harrows, 8 feet wide	80
Spring-tooth cultivator	75
Spring-tooth cultivator, with seeding attachment...	91
Drill—13-hoe	75
13-disc	188
15-hoe	190
15-disc	205
Reaper and binder	185
Stripper	225 to 250
Winnower	125
Harvester	365
Tip dray (one horse)	90
Spring van	100
Waggon (six or eight horse)	350 to 400

A Wheat Farm in New South Wales.

The freight on agricultural machinery is $4.50 per ton for 100 miles, $8 for 200 miles, and $10.52 for 300 miles.

Classes of Wheat Grown.

Australian wheat, like Australian wool, has characteristics of its own. British millers prize it because of the large amount of flour it produces, and because it gives colour and bloom to their product. Up till recently it was somewhat deficient in "strength," and, to supply this deficiency, British millers mix or blend it with Manitoba varieties. The two wheats combined produce a flour with both "strength" and "bloom."

The character of Australian wheat is, however, undergoing a change, and its strength is being improved by the introduction into general cultivation of the new wheats which the Department of Agriculture has produced by cross-breeding. Some years ago the Department commenced the work of wheat improvement with the object of breeding new wheats which would be stronger, more disease-resistant, and generally more suitable for Australian conditions than those at that time in general cultivation. Tangible results show that this work has been a success, both from a farmer's and from a miller's standpoint. The area planted with the new varieties increases each year. In 1913, in one district alone, over 15,000 acres were planted with one of the new varieties which had been introduced a few years previously. The effect of these new wheats on the quality of the locally-milled flour

WHEAT TEAMS LEAVING FARM FOR RAILWAY STATION, N.S.W.

has already been felt : its strength has appreciably improved. Another result of this work is that the importation of the strong Manitoba varieties, formerly purchased to blend with the local wheats, has practically ceased.

The new wheats as they are produced are distributed to the farmers who are anxious to try them on their farms, to determine their suitability or otherwise for their particular districts. Enough of this work has already been done, and sufficient evidence obtained, to predict with confidence that in the future Australian wheats will be desired, not only because they yield well, and for their ability to produce a large quantity of flour of excellent colour and bloom, but also because, without blending with other wheats, they will yield a "strong" flour, and one from which bakers will be able to make a large, well-risen, nutritious loaf, of good colour.

What the Future has in Store.

The prospects of the wheat-growing industry are exceedingly bright. It is capable of very wide expansion. Within what is known to be the area in which wheat-growing can be carried on with safety, a great proportion of the immense areas now devoted to pastoral purposes consists of land which could be profitably utilised for agriculture, much of it being more suitable for wheat than that already devoted to its cultivation. In this "safe" area, it is estimated that there are over 20,000,000 acres suitable for wheat-growing, and only 3,200,000 acres are now under this

crop. In addition to the "safe" area, the experimental work done by the Department of Agriculture plainly indicates that new methods and new varieties will render wheat-growing possible and profitable in districts previously considered to be too dry for it, thus adding considerably to the area available for the cultivation of wheat.

The Government, recognising that in many districts any large increase in area under crop can only be brought about through close settlement and the construction of light lines of railways, are pursuing a vigorous closer settlement policy. New lines of railway to tap the districts containing arable land are being constructed and other lines are being considered.

There is conclusive evidence that wheat-growing has proved, and is still proving, highly remunerative to those engaged in it, and as the naturally rough-and-ready methods of the pioneers give place to better and more advanced ones, it is not unreasonable to expect that it will prove still more profitable. The early settlers started with little or no capital, little practical knowledge, and no experience to guide them. Now there is the experience of a century to guide the present farmers, and, in addition, the work of the Agricultural Department is yearly adding to the information already obtained regarding the most suitable and profitable methods of cultivation. With a plentiful supply of suitable land still available, with more accurate information relating to the principles underlying wheat cultivation, with better methods of cultivation and handling, with better wheats, there must be and there are immense future possibilities before the wheat-growing industry in New South Wales.

Other Crops. Although wheat is the principal crop it must not be supposed that the farming operations of the State are confined to this cereal. In 1914, 162,000 acres were planted to maize, and produced a crop of 4,359,000 bushels. This means an average of 29 bushels per acre for the whole State. In the most favourable localities—in the North Coast—yields of as much as 80 to 100 bushels have been recorded. Oats are grown on the tableland and in the south-western slopes and Riverina. 103,000 acres in 1914 produced a crop of 1,835,000 bushels. Barley and rye are also cultivated. On the Northern rivers sugar-cane flourishes luxuriantly, and about 200,000 tons of cane are cut each year. About 5,000 acres are now devoted to wine-growing—an industry with a great future before it,—and about 600,000 gallons of excellent wine were produced in 1914. About 120,000 tons of potatoes were

grown during the season 1913–1914. Both the soil and the climate of large areas are admirably suited to tobacco cultivation, and attention is now being paid to this crop, particularly on the Murrumbidgee Irrigation Area, where the industry is already well established, and returning the growers results commensurate with their industry and enterprise. The native trees secrete rich stores of choice honey, so that bee-farmers can thus turn even steep, uncleared land to profitable use.

A Paradise of Opportunity.

The State of New South Wales is as remarkable for the fertility of its soils as for the variety of its crops; and in the splendid openings that exist for agriculturists, in its equable climate, in the freedom of its institutions, and in its already enormous and constantly-growing commerce, New South Wales offers unsurpassed opportunities to the farmer who is seeking to build up a home for himself and children in one of the young lands.

In New South Wales a salubrious climate unites with a wonderful variety of rich soils to produce everything that man needs for his sustenance, or even luxury. Almost every crop known to agricultural science is raised within its borders, and they are grown and harvested at a lower cost than in any other country. The natural pastures support its millions of sheep, cattle, horses and swine, with hardly any adventitious aid. The cattle graze in the open fields throughout the whole year.

Although the wealth produced annually from the State's primary industries is already reckoned in millions of pounds sterling, the work of their development may be said to have just begun, and it is impossible to foresee the limits to which they are capable of expansion.

The person thinking of turning his attention to this, the Best of the New Countries, will be furnished with the fullest information concerning the resources of New South Wales and its opportunities of employment on application to the Assistant Superintendent of Immigration, New South Wales and Victoria, Melbourne Place, Strand, London, W.C.; the Trade Commissioner for New South Wales, 419 Market-street, San Francisco, U.S.A.; or to the Assistant Superintendent of the Immigration and Tourist Bureau, Challis House, Sydney, New South Wales, Australia.

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THE TRADE COMMISSIONER FOR NEW SOUTH WALES, 419 Market-street, San Francisco, U.S.A.;

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or

THE IMMIGRATION and TOURIST BUREAU, Challis House, Sydney, New South Wales, Australia.

PERCY HUNTER,
SUPERINTENDENT.